

On page 19, line 16, please insert --(SEQ ID NO:5)-- after "TTCATGGAATCCCTTGA
CGTTACAACCCATC-3".

On page 19, line 17, please insert --(SEQ ID NO:6)-- after "5'-AGGCTGCCTGGCTAA
TCCGCGCCAG-3".

Insert pages 1-10 of the enclosed sequence listing at the end of the application.

IN THE CLAIMS:

Please cancel claims 36 and 37.

B²
34. (Amended) A vaccine to induce protective immunity against *Pasteurella haemolytica* infection, comprising: an isolated *Pasteurella* [for *P.*] *haemolytica* bacterium which comprises [an *aroA*] a mutation in a gene selected from the group consisting of *aroA*, *PhaI*, leukotoxin C, leukotoxin A, leukotoxin B, leukotoxin D, and neuraminidase [introduced into *P. haemolytica* using methylated DNA, which is administered by intranasal, intratracheal, intramuscular, subcutaneous, intravenous, or oral routes].

Please add new claims 38-44.

--38. The vaccine of claim 34 which is which is administered by intranasal, intratracheal, intramuscular, subcutaneous, or intravenous routes.--

--39. The vaccine of claim 34 which is administered by subcutaneous injection.--

Sub E¹
--40. The vaccine of claim 34 comprising *P. haemolytica* ATCC 55518.--

B³
--41. A vaccine for inducing protective immunity against *Pasteurella haemolytica* infection, comprising: an isolated *Pasteurella haemolytica* bacterium which comprises an *aroA* mutation.--

--42. The vaccine of claim 41 containing an adjuvant.--

Sub E²
--43. The vaccine of claim 41 which is which is administered by intranasal,

intratracheal, intramuscular, subcutaneous, or intravenous routes.--

--44. The vaccine of claim 41 which is administered by subcutaneous injection.--

~~45. The vaccine of claim 34 wherein the gene is *PhaI*.--~~

--46. The vaccine of claim 34 wherein the gene is leukotoxin C.--

--47. The vaccine of claim 34 wherein the gene is leukotoxin A.--

--48. The vaccine of claim 34 wherein the gene is leukotoxin B.--

--49. The vaccine of claim 34 wherein the gene is leukotoxin D.--

~~50. The vaccine of claim 34 wherein the gene is neuraminidase.--~~

REMARKS

The Amendments

The specification has been amended to provide sequence identification numbers. A Sequence Listing in paper and computer readable form is supplied by this amendment which includes all sequences disclosed in the specification. It is my belief that the content of the computer readable form is the same as that of the paper copy of the Sequence Listing. All sequences appearing in the sequence listing are supported by and included in the specification. No new matter is added by this amendment.

Claim 34 has been amended to recite that the mutation is in a gene selected from the group consisting of *aroA*, *PhaI*, leukotoxin C, leukotoxin A, leukotoxin B, leukotoxin D, and neuraminidase. Support for the amendment can be found in the specification at, *inter alia*, page 7, lines 4-12.

Site-directed mutagenesis of *P. haemolytica* can be accomplished according to the present invention by first isolating a wild-type DNA region from *P. haemolytica*. As described below in the examples, an *aroA* gene can be